Larval morphology of the water mite *Sperchonopsis reducta* Sokolow, 1940 (Acariformes, Sperchontidae)

Морфология личинки водяного клеща *Sperchonopsis reducta* Sokolow, 1940 (Acariformes, Sperchontidae)

P.V. Tuzovskij

П.В. Тузовский

P.V. Tuzovskij, Institute for Biology of Inland Waters of the Russian Academy of Sciences, Borok, Yaroslavl Province, 152742, Russia. E-mail: tuz@ibiw.yaroslavl.ru

A larva of the water mite *Sperchonopsis reducta* Sokolow, 1940 is described. The idiosoma of the larva bears 18 pairs of setae, the dorsal plate has a wide and slightly convex anterior margin and a pointed posterior end; the setae Fch are not longer than the trichobothria Fp and Oi, the setae Pe are shorter and thinner than the setae Pi; the urstigmae are with well developed caps; the capitulum has a long basis and a short rostrum; the pedipalpal tarsus bears three large serrate unequal setae, a single solenidion, and four thin short smooth setae.

Описана личинка водяного клеща *Sperchonopsis reducta* Sokolow, 1940. Идиосома несет 18 пар щетинок; передний край дорсального щита широкий и немного выгнутый, задний конец заостренный; щетинки Fch не длинее трихоботрий Fp и Oi, щетинки Pe короче и тоньше щетинок Pi; урстигмы с хорошо развитыми «крышками»; капитулюм имеет длинное основание и короткий рострум; лапка педипальпы несет три крупные пильчатые щетинки неравной длины, один соленидий и четыре гладкие, тонкие и короткие щетинки.

Key words: water mite, larva, morphology, Acariformes, Sperchontidae, *Sperchonopsis reducta*

Ключевые слова: водяные клещи, личинка, морфология, Acariformes, Sperchontidae, *Sperchonopsis reducta*

INTRODUCTION

The water mite genus *Sperchonopsis* Piersig, 1896 (Prostigmata: Sperchontidae) includes about twenty species and subspecies (Viets, 1987), but larvae of only three species were described: *S. verrucosa* (Protz, 1896), *S. nova* (Prasad & Cook, 1972), and *S. ecphyma* (Prasad & Cook, 1972) (Protz, 1896; Piersig, 1901; Prasad & Cook, 1972; Smith, 1982; Martin, 2000). Larvae of the genus *Sperchonopsis* parasitize on Diptera: Simulidae, Chironomidae, Tipulidae (Smith, 1982; Smith & Oliver, 1986). Three species of the genus *Sperchonopsis* are known in the fauna of Russia: *S. verrucosa* (Protz, 1896), *S. reducta* (Sokolow, 1940) and *S. minutipora* Tuzovskij, 1990 (Tuzovskij, 1990, 2002). *S. reducta* was described by Sokolow (1940) as a variety of *S. verrucosa* (*S. verrucosa* var. *reducta*). Viets (1956) considered it as a subspecies (*S. verrucosa reducta)*, and later on, as a distinct species (*S. reducta*) (Viets, 1987). This species was recorded only from North Ossetia (Sokolow, 1927, 1940). In this paper I provide the first description of a larva of *S. reducta* from the Krasnodarskiy Kray (Russia).

MATERIAL AND METHODS

Larvae were reared from a single female in laboratory conditions. A mature female was placed in a separate glass cylinder

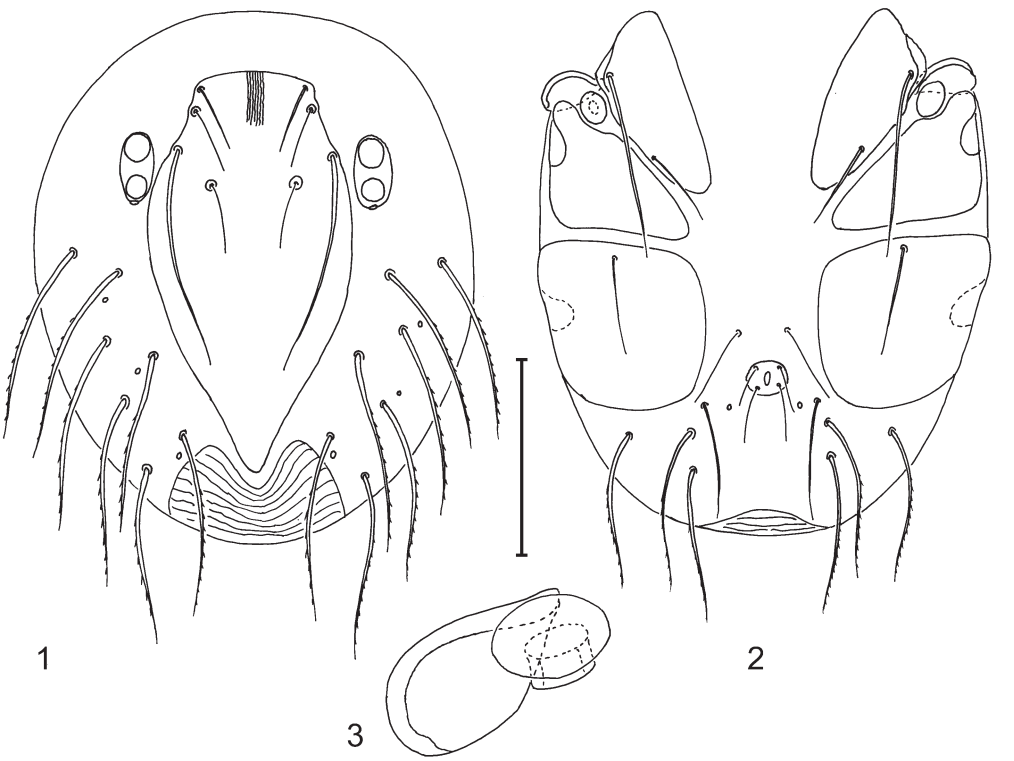
15 mm in diameter and 10 mm in height. The duration of embryonic period was 14–15 days at room temperature. In the description, the terminology and abbreviations of idiosomal setae and lyriform organs follow Tuzovskij (1987). The following abbreviations are also used: s, solenidion; ac, acanthoid seta; P–1–5, pedipalp segments (trochanter, femur, genu, tibia and tarsus, respectively); I–Leg.1–5, first leg: segments 1–5 (trochanter, femur, genu, tibia and tarsus, respectively).

DESCRIPTION

Sperchonopsis reducta Sokolow, 1940 (Figs 1–14)

Material examined. Six larvae reared from one female, **Russia,** Krasnodarskiy Kray, Seversk Distr., Ubin River at Ubinsk, coll. P.V. Tuzovskij, 22 June 1976; slides 1946, 1954, 1955 deposited in the collection of the Institute for Inland Water Biology, Russian Academy of Sciences (Borok, Russia).

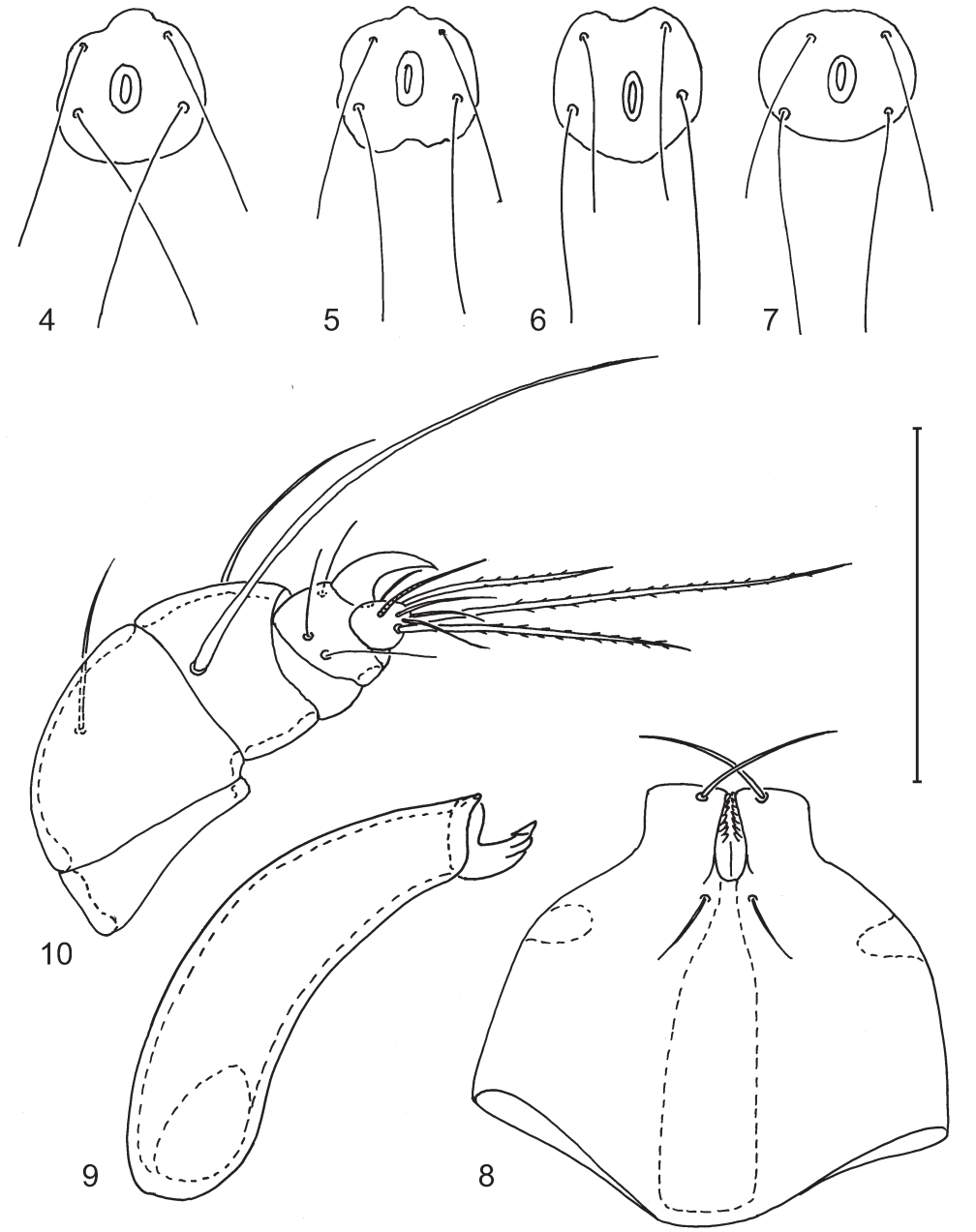
Description. Larva. Dorsal surface (Fig. 1) with elongate plate (ratio length/width 1.7–1.9). Anterior margin of dorsal plate wide slightly convex almost straight, median part expanded, posterior end pointed. Anterior part of this plate with two pairs of tactile setae (Fch, Vi) and two pairs trichobothria (Fp, Oi). Setae Fch, Fp and Oi subequal in length, but Fch thicker than trichobothria. Setae Vi thick, three times as long as others setae on dorsal plate. Surface of dorsal plate with numerous thin longitudinal strips, other surface of dorsum soft with fine wrinkles. Integument in posteromedial part of dorsum with rough wrinkles. Lateral eyes located on elongate platelets, lenses of anterior eyes slightly larger than posterior ones, distance between anterior and posterior lenses lesser than diameter one lens. Setae Oe, Hi, He, Sci, Sce, Li and



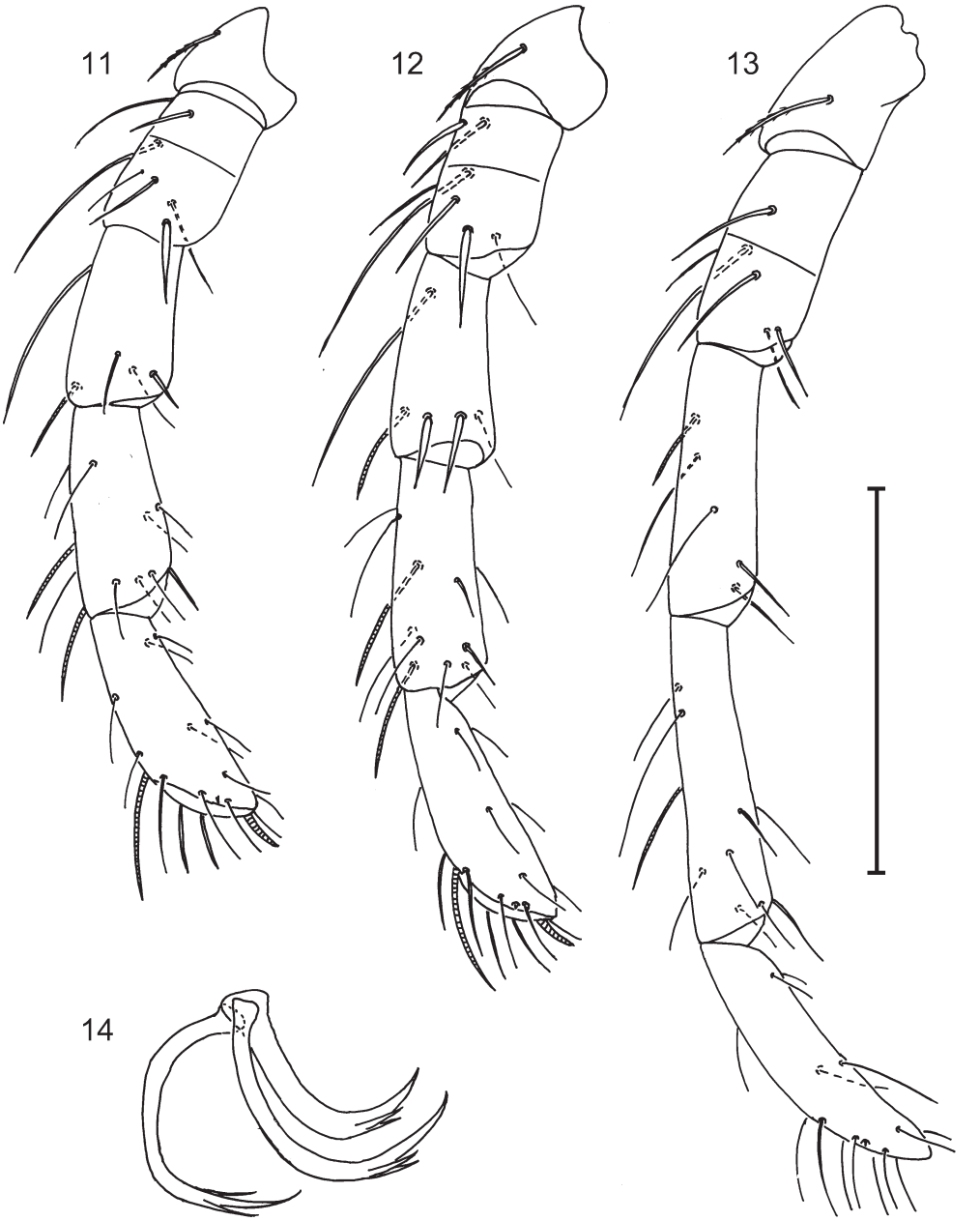
Figs 1–3. *Sperchonopsis reducta*, larva, idiosoma: **1**, dorsal view; **2**, ventral view; **3**, urstigma, lateral view. Scale bar: 75 μm (1, 2).

Le approximately subequal in length. Dorsum with four pairs of lyriform organs: i1, situated immediately behind to posterior edge of the eye platelets; i2, corresponding to the humeral row of setae i3; corresponding to the scapular row of setae; i4, corresponding to the lumbar row of setae.

Coxae of all legs separated on each side (Fig. 2). Coxae of legs I and II moderately developed, triangular in shape; coxae III



Figs 4–10. *Sperchonopsis reducta*, larva: **4–7**, anal plate; **8**, capitulum, ventral view; **9**, chelicera, lateral view; **10**, pedipalp, lateral view. Scale bar: 50 μm.



Figs 11–14. *Sperchonopsis reducta*, larva: **11**, leg I; **12**, leg II; **13**, leg III; **14**, claws. Scale bar: 100 μm.

trapezoidal, larger than first or second coxa . Coxa I with 2 setae: 1 long, thick lateral seta and 1 short, thin medial seta. Coxae II without setae. Coxa III with 1 seta near middle of its anterior margin. Setae Pe placed between internal margins of coxae III, others ventral setae situated behind these coxae. Setae Pi longer and thicker than Pe. Setae Si, Se, and Ci subequal in length and slightly longer than setae Pi. Lyriform organs

(i5) located in space between anal plate and bases of setae Pi and Ci. Larval organs (urstigmae) rather large oval, placed between coxae I and II laterally, and supplied by convex caps (Fig. 3).

Anal plate small, it shape variable (Figs 4–7); anal opening situated usually in center of plate or between setae Ae (Fig. 6), anterior anal setae (Ai) shorter than posterior ones (Ae).

Capitulum (Fig. 8) with wide base part and short rostrum (length of rostrum 0.15–0.2 times as long as length of capitulum), anterior ventral setae longer and thickness than posterior ones.

Chelicerae (Fig. 9) with large basal segment and small crescent stylet, dorsal side of basal segment convex, ventral one concave. Cheliceral stylet with one very small subapical tooth.

Trochanter of pedipalp (Fig. 10) short without setae, femur with 1 seta, genu with 1 long anterolateral seta and relatively short dorsal one. Pedipalpal tibia with large dorsodistal claw and 3 unequal thin setae. Pedipalpal tarsus small, with 3 thick serrate unequal setae, 4 short, thin setae, and 1 solenidion.

Leg 5 segmented, basifemur and telofemur fused to each other, but suture line between them distinctly developed (Figs 11–13). Number of legs setae (number specialized setae, excluding eupathids, in brackets): I–Leg. 1–6: 1, 7, 5 (s), 11 (2s), 16 (s, ac); II–Leg. 1–6: 1, 7, 5 (s), 11 (2s), 16 (s, ac); III–Leg. 1–6: 1, 6, 5 (s), 10 (s), 14. Legs III much longer than legs I and II. Femoral segments of all legs and genua of legs I–II with 1 long dorsolateral seta each. Solenidion on genu leg I and II situated distally, and solenidion on genu legs III located proximally. Acanthoid setae short and present only on tarsi of both anterior pairs of legs. Tarsi of all legs with rather short, thick empodium and long, thin ambulacra (Fig. 14). All leg claws provided by 2 subapical additional denticles.

Measurements, μm. Length of dorsal plate 150–160, width 65–71; length of setae Fch, Fp and Oi 20–29, length of setae Vi 85–95, length of urstigma 16–19, width 9–11; length of eye plate 25–32, width 12–16; length of anal plate 12–16, width 12–19; length of capitulum 70–77, width 73–78, length of rostrum 12–16; length of basal segment of chelicera 65–71, length of cheliceral stylet 10–13; length of pedipalpal segments (P–1–5): 12–16, 32–42, 22–26, 13–19, 9–10; length of lateral margin of leg coxae I 35–42, length of lateral margin of leg coxae II 44–52, length of lateral margin of leg coxae III 65–70; length of legs segments: I–Leg. 1–5 – 28–35, 38–42, 44–48, 48–52, 55–65; II–Leg. 1–5 – 32–39, 35–42, 48–52, 55–61, 60-65; III–Leg. 1–5 – 45–52, 48–53, 62–66, 75–80, 70–77.

Comparison. The larva of *S. reducta* is similar to the larva of *S. verrucosa* (Protz, 1896) but differs from the latter by the following characters (character states of *S. verrucosa* larva, given in parentheses, are taken from Martin [2000]): anterior margin of dorsal plate wide, only 2 times in the maximum width of the plate (vs. narrow, three times in the maximum plate width); posterior end of dorsal plate pointed (vs. convex and rounded, similar to anterior end); distance between anterior and posterior lenses of lateral eyes less than diameter of one lens on each side (vs. approximately 3 times as long as diameter of one lens); number of setae, excluding eupathids, on tarsus of legs I–III: 16, 16, 14 (vs. 14, 14, 13).

The larva of *S. reducta* clearly differs from both American species (S. *nova* and *S. ecphyma)* by the structure of the capitulum. The capitulum of *S. nova* and *S. ecphyma* larvae has a long rostrum, its length is subequal to 1/2 length of the capitulum; the capitulum is maximally widened in its central part, and its posterior end is narrow (Prasad & Cook, 1972; Smith, 1982). In contrast, the larval rostrum of *S. reducta* is short (length of the rostrum is 0.15–0.2 times as long as length of the capitulum), and its posterior part is the widest part of the capitulum.

REFERENCES

Martin, P. 2000. Larval morphology and host–parasite associations of some stream living water mites (Hydrachnidia, Acari). *Archiv für Hydrobiologie* (Supplement), **121**(3/4): 269–320.

Piersig, G.R. 1901. Hydrachnidae. *In:* **Piersig, G.R. & Lohmann** (Eds.) Acarina, Hydrachnidae und Halacaridae. *Tierreich,* **13**: 1–336.

Prasad, V. & Cook, D.R. 1972. The taxonomy of water mite larvae. *Memoirs of the American Entomological Institute,* **18**: 1–326.

Protz, A.J.O. 1896. Beirtäge zur Hydrachnidenkunde. *Zoologischer Anzeiger,* **19**: 23-26.

Smith, I.M. 1982. Larvae of water mites of the genera of superfamily Lebertioidea (Prostigmata: Parasitengona) in North America with comments on phylogeny and higher classification of the superfamily. *The Canadian Entomologist,* **114**: 901–990.

Smith, I.M. & **Oliver, D.R.**. 1986. Review of parasitic associations of larval water mites (Acari: Parasitengona: Hydrachnida) with insect hosts. *The Canadian Entomologist,* **118**: 407–472.

Sokolow, I. 1927. Beitrag zur Kenntnis der Hydracarinenfauna von Caucasus. *Raboty Severo-Kavkazskoy Gidrobiologicheskoy Stanzii*, Vladikavkaz [Travaux de la Station Biologique du Caucase du Nord], **2**(1): 43–72 + 4 tables.

Sokolow, I.I. 1940. Hydracarina – the aquatic mites. Part I – Hydrachnellae. *Fauna SSSR (New Series, No. 20), Paukoobraznye (Arachnides)*, **5** (2). Moscow–Leningrad, 24+511 p. (In Russian).

Tuzovskij, P.V. 1987. *Morfologiya i postembrional'noe razvitie vodyanykh kleshchey* [Morphology and postembryonic development of water mites]. Moscow: Nauka. 172 p. (In Russian).

Tuzovskij, P.V. 1990. *Opredelitel' deytonimf vodyanykh kleshchey* [Key to water mite deutonymphs]. Moscow: Nauka. 238 p. (In Russian).

Tuzovskij, P.V. 2002. K sistematike vodyanogo kleshcha *Sperchonopsis minutiporus* Tuzovskij, 1990 (Acariformes, Sperchontidae) [To systematics of water mite Sperchonopsis minutiporus Tuzovskij, 1990 (Acariformes, Sperchontidae]. *Biologiya Vnutrennikh Vod* [Biology of Inland Waters], **2**: 33–37 (In Russian).

Viets, K. 1956. *Die Milben des Süßwassers und des Meeres. Hydrachnellae et Halacaridae (Acari). Zweiter und dritter Teil: Katalog und Nomenklator.* Jena: G. Fischer: 1–870.

Viets, K.O. 1987. Die Milben des Süsswassers (Hydrachnellae und Halacaridae [part], Acari. 2: Katalog. *Sonderbände des Naturwissenschaftlichen Vereins in Hamburg,* **8**: 1–1012.

Received 25 March 2008 / Accepted 10 May 2010